

CLAIMS

We claim:

1. An optical monitoring system for transmitting images from a hostile environment within the interior of a sealed chamber to the chamber exterior, the chamber
5 having a wall and an access port extending through the wall, the monitoring system comprising:

a flexible, generally tubular, elongated housing having a distal end, a proximal end and an interior, the housing being made of a non-porous, hermetically sealed, corrosive resistant material, the distal end of the housing including a sealed window, the proximal end of the housing being sealingly secured to the chamber wall at the access port so
10 that the interior of the housing is accessible through the port, the interior of the housing including a transmission media for transmitting images of the interior of the chamber obtained through the window from the distal end of the housing to the proximal end of the housing and through the port; and

a monitor located outside of the chamber and connected to the
15 transmission media for receiving and displaying the images of the interior of the chamber.

2. The optical monitoring system as recited in claim 1, wherein the housing comprises a flexible sheath formed of a stainless steel bellows.

20 3. The optical monitoring system as recited in claim 1, wherein the housing comprises a flexible polymeric tube.

4. The optical monitoring system as recited in claim 1, wherein the window is formed from a material selected from the group consisting of synthetic sapphire, glass, quartz
25 and a polymeric material.

5. The optical monitoring system as recited in claim 4, wherein the window is secured to the housing by a method selected from the group consisting of brazing, fusion and an adhesive.

6. The optical monitoring system as recited in claim 1, wherein the housing includes a borescope having a viewing end which is aligned with the sealed window.

5 7. The optical monitoring system as recited in claim 1, wherein the transmission media is comprised of a coherent fiber optic bundle.

8. The optical monitoring system as recited in claim 1, wherein the interior of the housing is provided with a fluid under pressure to control the environment within the interior of the housing.

9. An optical monitoring system for transmitting images from a hostile environment within the interior of a sealed chamber to the chamber exterior, the chamber having a wall and an access port extending through the wall, the monitoring system comprising:

10 a flexible, generally tubular, elongated housing having a distal end, a proximal end and an interior, the housing being made of a non-porous, hermetically, sealed, corrosive resistant material, the distal end of the housing including a sealed window and a camera positioned to record images of the interior of the chamber through the window, the proximal end of the housing being sealingly secured to the chamber wall at the port so that the interior of the housing is accessible through the port, the interior of the housing including a transmission media for transmitting the images of the interior of the chamber recorded by the camera from the distal end of the housing to the proximal end of the housing and through the port; and

25 a monitor located outside of the chamber and connected to the transmission media for receiving and displaying the recorded images of the interior of the chamber.

10. The optical monitoring system as recited in claim 9, wherein the camera is a video camera.

11. The optical monitoring system as recited in claim 9, wherein the housing comprises a flexible sheath formed of a stainless steel bellows.

5 12. The optical monitoring system as recited in claim 9, wherein the housing comprises a flexible polymeric tube.

13. The optical monitoring system as recited in claim 9, wherein the window is formed from a material selected from the group consisting of synthetic sapphire, glass, quartz and a polymeric material.

10 14. The optical monitoring system as recited in claim 9, wherein the window is secured to the housing by a method selected from the group consisting of brazing, fusion and an adhesive.

15 15. The optical monitoring system as recited in claim 9, wherein the camera is of the infrared type.

20 16. The optical monitoring system as recited in claim 9, wherein the interior of the housing is provided with a fluid under pressure to control the environment within the interior of the housing.

25 17. An optical monitoring system for transmitting images from a hostile environment within the interior of a sealed chamber to the chamber exterior, the chamber having a wall and an access port extending through the wall, the monitoring system comprising:
a flexible, generally tubular, elongated housing having a distal end, a proximal end and an interior, the housing being made of a non-porous, hermetically, sealed, corrosive resistant material, the distal end of the housing including a sealed window, the proximal end of the housing being sealingly secured to the chamber wall at the port so that the

interior of the housing is accessible through the port, the interior of the housing including a flexible borescope for transmitting images of the interior of the chamber obtained through the window from the distal end of the housing to the proximal end of the housing and through the port; and

5 a monitor located outside of the chamber and connected to the borescope for receiving and displaying the images of the interior of the chamber.

18. The optical monitoring system as recited in claim 17, wherein the housing comprises a flexible sheath formed of a stainless steel bellows.

10 19. The optical monitoring system as recited in claim 17, wherein the housing comprises a flexible polymeric tube.

15 20. The optical monitoring system as recited in claim 17, wherein the window is formed from a material selected from the group consisting of synthetic sapphire, glass, quartz and a polymeric material.

20 21. The optical monitoring system as recited in claim 17, wherein the window is secured to the housing by a method selected from the group consisting of brazing, fusion and an adhesive.

22. The optical monitoring system as recited in claim 17, wherein the interior of the housing is provided with a fluid under pressure to control the environment within the interior of the housing.

25 23. A monitoring system for monitoring a parameter of a hostile environment within the interior of a sealed chamber, the chamber having a wall and an access port extending through the wall to the chamber exterior, the monitoring system comprising:

a flexible, generally tubular, elongated housing having a distal end, a proximal end and an interior, the housing being made of a non-porous, hermetically sealed, corrosive resistant material, the distal end of the housing including a sealed window and a sensor for sensing a parameter of the hostile environment through the window, the proximal end of the housing being sealingly secured to the chamber wall at the port so that the interior of the housing is accessible through the port, the interior of the housing including a transmission media for transmitting an output signal of the sensor from the distal end of the housing to the proximal end of the housing and through the port; and

an apparatus located outside of the chamber and connected to the transmission media for receiving and processing the sensor signal and displaying a representation of the sensor signal.

24. The optical monitoring system as recited in claim 23, wherein the sensor is selected from the group consisting of a temperature sensor, a pressure sensor, an oxygen sensor and a spectra graphic chemical analysis sensor.

25. The optical monitoring system as recited in claim 23, wherein the housing comprises a flexible sheath formed of a stainless steel bellows.

26. The optical monitoring system as recited in claim 23, wherein the housing comprises a flexible polymeric tube.

27. The optical monitoring system as recited in claim 23, wherein the window is formed from a material selected from the group consisting of synthetic sapphire, glass, quartz and a polymeric material.

28. The optical monitoring system as recited in claim 23, wherein housing further includes a sealed window secured to the distal end of the housing by a method selected from the group consisting of brazing, fusion and an adhesive.

29. The optical monitoring system as recited in claim 23, wherein the interior of the housing is provided with a fluid under pressure to control the environment within the interior of the housing.